During the entire season 885 forest fires or 55 percent of all of the fires on these national forests were started by lightning. This great source of forest fires, in which most of the danger was concentrated upon relatively few days, placed a peak-load burden upon the fire protection organization.

PRELIMINARY REPORT ON TORNADOES IN THE UNITED STATES DURING 1935

By R. J. MARTIN

[Weather Bureau, Washington, January 28, 1935]

In keeping with the custom of recent years, a preliminary statement of loss of life and property damage by windstorms is here included in the December issue of the REVIEW. A final and more detailed study will appear in the Report of the Chief of the Weather Bureau for the year 1935–36. Practically all the information given in this summary is abstracted from the monthly tables of "Severe Local Storms", which are compiled from the reports of many observers and various section directors of the Bureau. While it is thought the figures given are substantially correct, it must be remembered that all are subject to change after the final study mentioned above.

May, with 44 (possibly 45) tornadoes, was the month with the greatest number of such storms; but the total loss of life, 16, was considerably less than the April figure. June, with 28 (possibly 34) storms, was second, while March had 26 (or 32) and April had 24 (or 27). February and July each had 16 tornadoes, but the later study may change the July figure to 21. The greatest loss of life occurred in April, when 28 persons were killed; 17 deaths were reported in Mississippi and 9 in Louisiana, caused by the storms of the 6th, which are described in the April 1935 Climatological Data for these States. The deaths in Louisiana occurred when the tornado capsized a houseboat. Tornadoes caused 16 fatalities during May, and 13 persons were killed in Texas on February 8 by a tornado which struck 8 counties. Storms resulting in four or more deaths occurred in Nebraska (May 31), Arkansas (June 21), and Mississippi (March 31).

Tornadoes occurred without loss of life in August, October, and November. June had six fatalities, July had five, and four deaths resulted from these storms in September. No tornadoes were reported in January or December.

The total property loss caused by tornadoes in 1935 is estimated at over $4,917,000; March, with estimated tornado or tornadic wind damage of over $1,217,400, was the month of greatest property loss. The second highest figure was $1,009,600 in April; over $395,000 of this was caused by the Louisiana and Mississippi storms (mentioned above) over paths varying in width from 17 to 880 yards. The June storms resulted in losses of more than $979,500, of which $300,000 occurred on the morning of the 21st at Texarkana, Ark., and vicinity.

The total number of tornadoes during the year, approximately 179, was 32 more than in the preceding year, but 81 less than in 1933; the 1935 total has been exceeded 4 times in the last 20 years. During March and May of 1933, 150 tornadoes occurred; the total for the corresponding months of 1935 was 70. The total number of deaths resulting from the 1935 storms is estimated at 86, which is nearly double the figure for the preceding year (47). Other than the Texas, Louisiana, and Mississippi storms mentioned above, there were no unusually severe tornadoes during 1935, and each of these have been greatly exceeded in other years.

If further study shows the storms listed in the table of tornadic winds to be true tornadoes, the 1935 sums will be 200 tornadoes, 86 deaths, and property losses exceeding $5,514,300.

TORNADOES AND PROBABLE TORNADOES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Number	0	16	26	24	44	28	16	8	13	1	3	0	179
Deaths	---	14	13	28	16	6	5	0	4	0	0	---	86
Damage [1]	---	507.0	1,075.4	1,005.6	884.4	719.5	341.8	52.1	302.3	4.5	24.4	---	4,917.0

TORNADIC WINDS AND POSSIBLE TORNADOES [2]

Number	0	0	6	3	1	6	5	0	0	0	0	0	21
Deaths	---	---	0	0	0	0	0	---	---	---	---	---	0
Damage [1]	---	---	142	4	4	260	187	---	---	---	---	---	597

[1] In thousands of dollars.
[2] Some of these may not be classed as tornadoes in the final study.

THE WEATHER OF 1935 IN THE UNITED STATES

By R. J. MARTIN

[Weather Bureau, Washington, D. C., February 1935]

The year 1935 averaged nearly 2° cooler than 1934; and precipitation, while still subnormal, was considerably more plentiful than in the preceding year. The temperature departure, all sections considered, was +0.7°, as compared with +2.5° in 1934, and the precipitation departure was only −0.6 inch; in 1934 it was −3.7 inches.

Table 1 shows that for the year as a whole only three sections of the country, New England, the Florida Peninsula, and the lower Lake region, averaged cooler than *normal, and the maximum deficiency (lower Lake region)* was only 0.3°. Five sections were exactly normal, while in the other 13 the temperature ranged from 0.1° to 1.1° above normal. The relatively warmest section was the Middle Slope (portions of Oklahoma, Kansas, and Colorado). The relatively warmest month was February, when the entire country averaged 3.3° above normal; in March the excess was 3°. January, July, August, September, and October were also warmer than normal, while April, May, June, November, and December were below normal. May, with a negative departure of 1.8°, was the relatively coldest month, followed closely by December, with a deficiency of 1.7°. In February, only 2 of the 21 sections had subnormal warmth and in both instances the deficiency was only 0.5°; in North Dakota that month averaged nearly 16° above normal, and elsewhere the plus departures ranged from 0.1° to 8.8°. The largest sectional negative departures occurred in December, due mostly to severe cold in the latter part of the month, and ranged from less than 1° to more than 7°.

Chart 1 shows that those sections of the country averaging cooler than normal were few in number and of

limited extent; small areas of subnormal warmth are found on the Gulf and Atlantic coasts, in portions of the Lake region, locally in the Ohio Valley and Northeast, in Missouri, Arizona, and New Mexico, northwestern Wyoming, western Idaho, and northern California. Elsewhere the temperature was above normal, with the largest departures noted in the Texas Panhandle.

Extremes for the year were well within the previous records of −66° (Riverside Ranger Station, Yellowstone Park, Wyo., February 1933) and 134° (Greenland Ranch, Calif., July 1913). Temperatures of 100° or higher occurred in 42 States; in Delaware, New Hampshire, and New York the maximum for the year was 99°, while Vermont, Rhode Island, and Connecticut had maxima in the high 90's. The absolute highest for the year was 123° on July 13 at Cow Creek, Inyo County, Calif., elevation −152 feet; in 1934 the yearly maximum was 125°, also in California in July. The lowest temperature for the year was −51° on January 23 at Pine River Dam, Crow Wing County, Minn., elevation, 1,251 feet, while for the preceding year the minimum was −52° in New York.

Temperatures of freezing or below occurred in every month of the year; and in every State at some time during the 12 months. July brought minima of freezing or below to 12 States, and August brought similar minima to 16 States; the lowest for July was 18° in Oregon, and for August was 16° in Idaho. Minima of zero or lower occurred in most States; January brought such temperatures to 36 of the 42 climatic sections of the country. In many States minima of −20° or below were reported.

Table 2 shows that for the United States as a whole six States were wetter than normal; but the excesses were small, ranging from 0.1 inch (January, April, and July) to 0.3 inch (May and June). In September the excess was only 0.2 inch. Three of the other six months (March, August, and November) were exactly normal, while February, October, and December were drier than normal with deficiencies ranging from 0.5 inch in February to 0.6 inch in October and December. In 1934 only 2 months were wetter than normal; but the departure for the relatively wettest month, November, was 0.8 inch. Eleven of the 21 sections shown in the table averaged drier than normal for the entire year, with deficiencies ranging from 0.1 inch in North Dakota to 7.4 inches in the North Pacific area (Washington and Oregon). The other 10 sections were above normal, with departures ranging from 0.3 inch over the southern Plateau (portions of Texas, New Mexico, Arizona, and southern California) to 6.2 inches over the west Gulf area.

During the year, 1,073 stations experienced at least 1 month with no precipitation; and 83 stations had months with totals of less than 0.01 inch. The greatest monthly amount in the United States was 50.39 inches at Quinault, Wash., in January. In Hawaii two stations had 54.00 inches in February, and Puhonua had a total of 55.20 inches in April. Hondo, Tex., and Simmesport, La., reported 22.40 inches and 21.17 inches, respectively, in May; Madison, Fla., had 20.68 inches, and Pensacola, 21.43 inches, in July and August, respectively; and in December, Wynoochee Oxbow, Wash., measured 22.01 inches. No other United States station reported as much as 20 inches in a single month during the year.

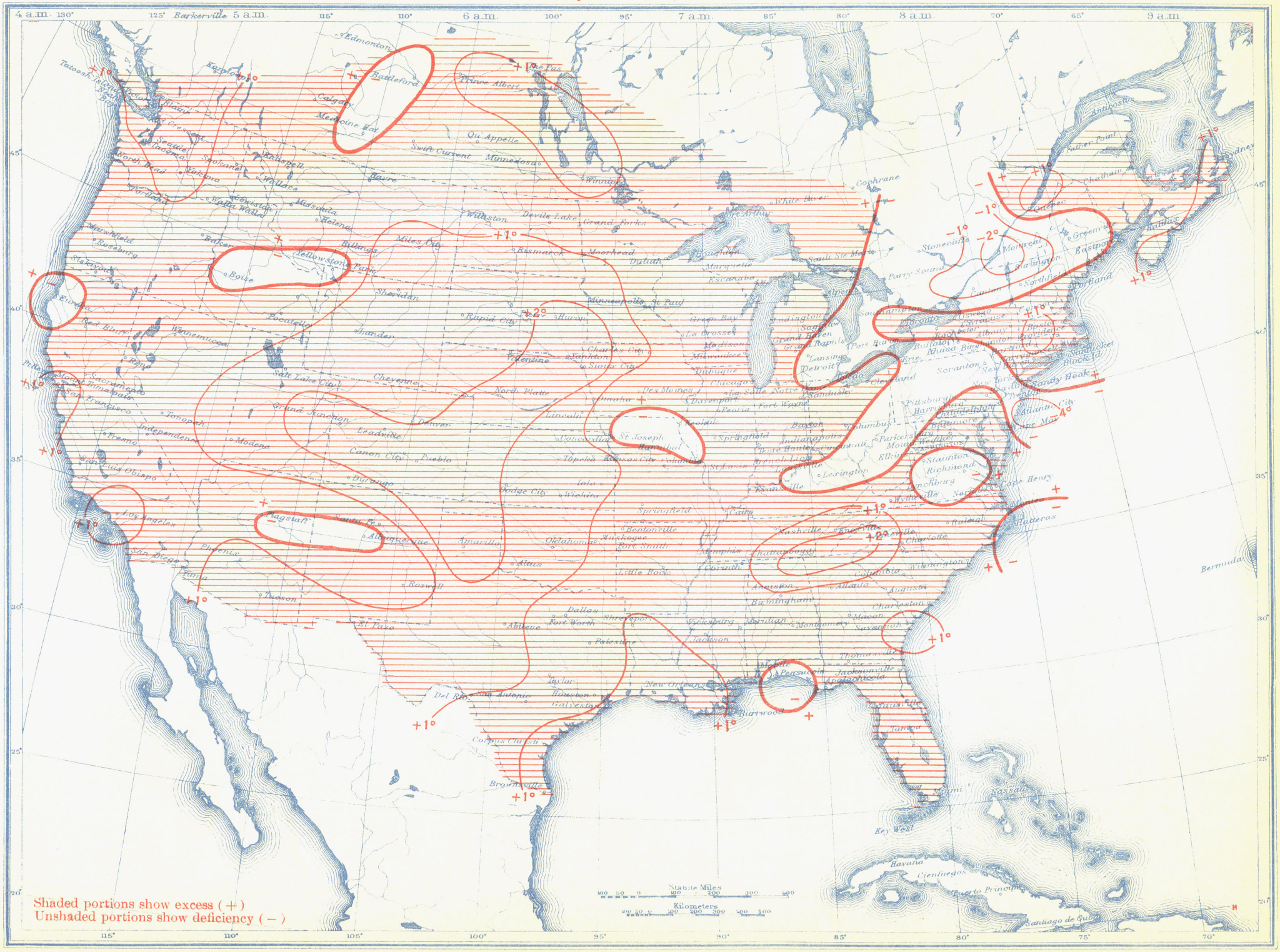
The accompanying charts based on reports from some 200 stations show temperature and precipitation departures in the United States for the year. Floods, hurricanes, tornadoes, and other outstanding features of 1935 are discussed elsewhere in this issue of the REVIEW.

TABLE 1.—*Monthly and annual temperature departures, 1935*

District	January	February	March	April	May	June	July	August	September	October	November	December	Average
New England	−3.7	−0.5	+2.8	+0.1	−1.6	0.0	+1.9	+1.6	−1.2	+0.5	+4.4	−4.0	−0.2
Middle Atlantic	−1.1	+.4	+5.4	−1.2	−2.5	+.2	+1.6	+.7	−1.6	+.5	+4.1	−5.0	.0
South Atlantic	+1.5	.0	+6.4	+.3	+.3	−1.4	−.2	+1.2	+.4	+1.1	+3.1	−7.1	.0
Florida Peninsula	+.9	−.5	+3.2	+2.4	+3.3	+1.2	.0	+1.1	+.3	+.8	+.3	−5.7	−.2
East Gulf	+2.1	+.1	+5.4	+.8	+1.3	−.3	+.8	+1.8	+.2	+2.3	+1.4	−6.4	+.1
West Gulf	+4.4	+1.1	+5.1	+.3	−1.7	−.9	+1.1	+2.2	−1.4	+2.6	−.9	−2.4	+.5
Ohio Valley and Tennessee	+2.3	+1.5	+7.6	−1.5	−2.8	−2.0	+2.6	+1.6	.0	+.8	+1.0	−7.2	.0
Lower Lakes	−.7	.0	+5.5	−1.4	−5.1	−1.4	+3.9	+1.6	−1.6	+.1	+1.9	−5.2	−.3
Upper Lakes	−.3	+3.3	+4.5	−1.0	−3.1	−2.2	+4.7	+2.0	−1.2	.0	−.8	−1.7	.0
North Dakota	−1.9	+15.8	+3.6	−1.6	−4.0	−2.0	+6.0	+.8	+.9	−.4	−8.7	+.5	+.5
Upper Mississippi Valley	+1.5	+5.7	+6.3	−2.1	−4.8	−3.3	+4.7	+1.8	+.9	+.2	−1.7	−3.4	+.2
Missouri Valley	+3.6	+8.3	+7.8	−2.4	−4.8	−2.5	+7.1	+2.9	+1.0	−1.2	−2.4	+.1	+.8
Northern Slope	+2.8	+8.8	+1.1	−3.9	−3.9	−.5	+4.3	+1.3	+2.0	+.1	−2.9	+3.0	+1.0
Middle Slope	+6.6	+5.8	+6.3	−1.8	−4.9	−1.3	+4.6	+3.3	−.2	+.2	−2.0	+1.4	+1.1
Southern Slope	+6.0	+2.2	+5.4	+1.4	−3.2	−1.0	−.1	+2.4	−3.0	+2.9	−.1	+.2	+1.0
Southern Plateau	+2.7	+2.0	−1.2	+1.4	−2.2	+3.0	+.9	+.9	+2.1	+1.5	−1.1	+1.5	+.6
Middle Plateau	+4.4	+4.0	−2.2	.0	−.6	+3.6	+1.5	+2.3	+4.4	.0	−3.6	+.9	+.6
Northern Plateau	+3.0	+2.4	−2.3	−2.2	.0	+.8	+1.7	+.7	+5.3	.0	−5.2	−.5	.0
North Pacific	+1.2	+4.2	−2.2	+.9	+.8	+2.0	+.8	+.8	+3.4	−.5	−2.6	+1.9	+.4
Middle Pacific	+.8	+1.7	−2.8	+1.8	+.6	+3.0	+.9	+1.3	+.1	−.3	−2.3	+1.5	+.2
South Pacific	+1.6	+2.2	−2.7	+1.1	+.3	+.6	−.2	+2.0	+1.3	+.4	−1.4	+2.5	+.5
United States	+1.8	+3.3	+3.0	−.4	−1.8	−.2	+2.3	+1.6	+.6	+.6	−.9	−1.7	+.7

Annual Temperature Departures (°F) in the United States, 1935

(Plotted by R. J. Martin)



Annual Precipitation Departures (inches) in the United States, 1935

(Plotted by R. J. Martin)

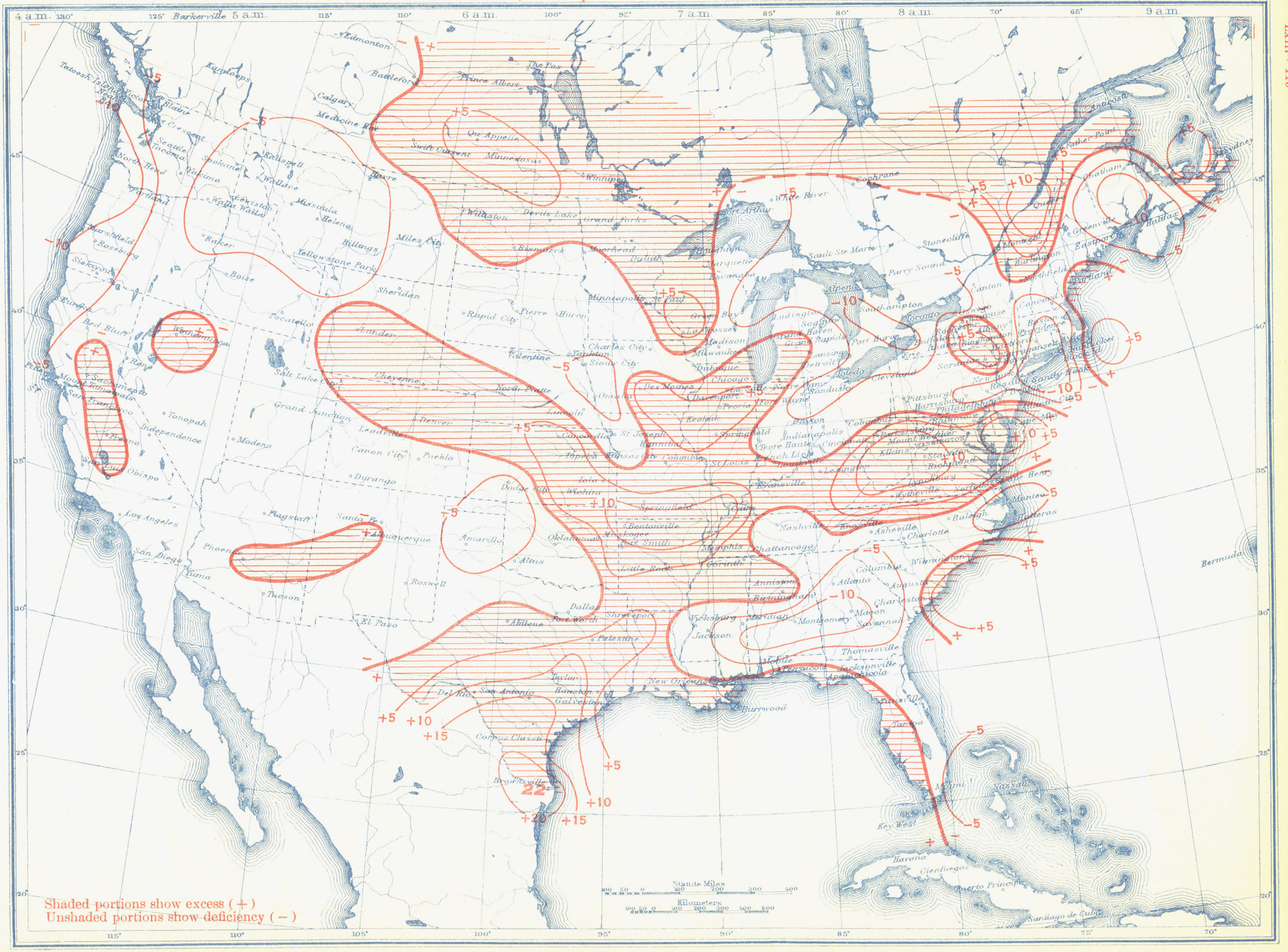


TABLE 2.—*Precipitation departures, monthly and annual, 1935*

District	January	February	March	April	May	June	July	August	September	October	November	December	Average
New England	+2.6	−0.4	−1.7	0.0	−1.4	+2.2	0.0	−1.7	+0.9	−2.2	+0.7	−2.1	−3.1
Middle Atlantic	+.5	−.5	−.5	+.3	−1.0	+.7	+.5	−1.5	+2.5	−.5	+2.0	−1.4	+1.1
South Atlantic	−.8	−1.6	−1.0	−.2	.0	−2.3	+3.6	+1.7	+1.7	−2.5	+.3	−.8	−1.9
Florida Peninsula	−1.5	−1.1	−1.7	+1.2	−2.6	+2.0	+2.5	+1.1	+2.5	−1.2	+1.2	−.4	+2.0
East Gulf	−2.3	−.7	+1.1	+.6	+1.4	−1.4	+.1	+1.8	−.4	−1.9	−.3	−.5	−2.5
West Gulf	−.1	+.1	+.6	−.6	+3.0	+2.5	−1.0	−1.4	+2.0	+.6	−.6	+1.1	+6.2
Ohio Valley and Tennessee	−.1	−1.3	+1.4	−.7	+2.4	+.3	+.3	+.9	−.6	.0	+.2	−1.3	+1.5
Lower Lakes	.0	−.4	−.6	−.4	−.5	−.2	+1.4	−.3	−.6	−.9	−.7	−.2	−3.4
Upper Lakes	+.5	−.6	−.1	−.9	−.8	+.9	.0	+.2	−.9	−1.1	+.6	−.7	−2.9
North Dakota	.0	−.4	.0	+.4	−.2	−.9	+1.9	+.6	−1.0	−.8	+.3	.0	−.1
Upper Mississippi Valley	+.4	−.3	+1.0	−.6	+1.6	+1.7	−.4	.0	−.7	+.3	+.8	−.6	+3.2
Missouri Valley	−.1	−.3	+.1	.0	+2.6	+.7	−2.2	−.7	−.7	+.7	+1.3	−.7	+.7
Northern Slope	−.3	−.2	.0	+.5	+1.0	−.9	−.6	−.3	−.8	−.5	−.3	−.5	−2.9
Middle Slope	−.2	.0	−.2	−.8	+2.2	+.6	−1.9	−.1	+.9	+.4	+.3	−.4	+.8
Southern Slope	−.2	+.4	+.3	−1.2	+1.4	+2.5	−1.0	−.5	+1.8	−.8	−.2	−.2	+2.3
Southern Plateau	+.2	+.4	−.2	.0	+.2	−.1	−.6	+.4	+.2	−.3	+.2	−.1	+.3
Middle Plateau	−.2	−.3	−.1	+.9	+.6	−.5	−.2	−.1	−.3	−.7	−.1	−.2	−1.2
Northern Plateau	−.6	−.8	−.3	+.7	−.7	−.6	−.3	−.2	−.6	−.4	−.7	−.6	−5.1
North Pacific	+2.2	−1.6	+1.9	−.8	−1.8	−.7	−.2	.0	−.7	−.2	−3.7	−1.8	−7.4
Middle Pacific	+1.0	−2.1	.0	+2.7	−1.0	−.3	.0	.0	−.2	+.4	−2.0	−.3	−1.8
South Pacific	+.6	+.8	+.7	+1.4	−.4	−.1	.0	+.1	−.2	−.2	−.3	−1.2	+1.2
United States	+.1	−.5	.0	+.1	+.3	+.3	+.1	.0	+.2	−.6	.0	−.6	−.6

TROPICAL STORMS IN THE NORTH ATLANTIC OCEAN DURING 1935

By WILLIS E. HURD

Five tropical disturbances were reported during 1935 in waters of the Atlantic, Caribbean Sea, and Gulf of Mexico, each of which attained full hurricane intensity along some portion of its path. Three hurricanes affected extreme southern Florida, two seriously, and of these one was of devastating violence, occasioning a sea-level barometer reading of 26.35 inches, the lowest of record in the Western Hemisphere. Two storms—one which crossed the Florida Keys on September 2, and the other which crossed the coast of Honduras on October 25—were accompanied by heavy loss of life. Storms no. IV and V were peculiarly erratic in general direction of movement. No. V was of extratropical origin, and although it moved southward and must be considered as a tropical storm, continued to betray extratropical characteristics.

Monthly frequency of West Indian hurricanes of the North Atlantic Ocean in 1935

	Hurricane intensity
August	1
September	2
October	1
November	1
Total	5

Synopsis of tropical storms of 1935 (number of storm in table corresponds with number of track on accompanying chart)

Storm	Date	Place where first reported	Coast lines crossed	Maximum wind velocity reported	Lowest barometer reported	Place of dissipation	Intensity	References
I	Aug. 18–25	Near lat. 20° N., long. 60° W.	Newfoundland	S. S. *Angelina*, W. 12; S. S. *York City*, S. 12.	28.20, S. S. *Angelina*	Newfoundland	Hurricane	M. W. R., vol. 63, p. 250, August 1935.
II	Aug. 31–Sept. 10	East and north of Turks Island.	Florida and Virginia.	Hurricane force by several ships and land observers.	26.35 [1]	South of Greenland.	Of phenomenal violence.	M. W. R., vol. 63, pp. 269–271, September 1935; vol. 63, p. 295, October 1935.
III	Sept. 23–Oct. 2	Near lat. 14° N., long. 75° W.	Cuba, Newfoundland.	120 miles (estimated) Bimini.	27.90, Bimini, final reading in advance of storm center.	Newfoundland	Hurricane	M. W. R., vol. 63, pp. 271–272, September 1935.
IV	Oct. 19–26	Western Caribbean Sea.	Cuba, Honduras	70 miles, Santiago, Cuba, and hurricane Cape Gracias, Honduras.	29.18, S. S. *Afel*	Honduras	do	M. W. R., vol. 63, pp. 294–295, October 1935.
V	Oct. 30–Nov. 8	East-northeast of Bermuda.	Florida	75, SE., Miami, Great Abaco Island, and several ships, hurricane.	28.46, S. S. *Queen of Bermuda*.	Off west coast of Florida.	do	M. W. R., vol. 63, pp. 316–318.

[1] Read on board a boat owned by Capt. Ivor Olsen, near the north end of Long Key, Fla. This is the lowest sea-level barometer reading of record in the Western Hemisphere and next to the lowest in the world. (See M. W. R., vol. 63, p. 295, October 1935.)